

Confirmation No. 7009

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appellant:	DURBAUM <i>et al.</i>	Examiner:	Pham, E.
Serial No.:	10/534,480	Group Art Unit:	2838
Filed:	May 10, 2005	Docket No.:	DE020261US (NXPS.302PA)
Title:	POWER CONVERTER		

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APPEAL BRIEF

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P.O. Box 1450  
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Customer No. <b>65913</b>
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Dear Sir:

This Appeal Brief is submitted pursuant to 37 C.F.R. §41.37, in support of the Notice of Appeal filed October 5, 2009 and in response to the rejections of claims 1-18 as set forth in the Final Office Action dated July 6, 2009.

**Please charge Deposit Account number 50-4019 (DE020261US) \$540.00** for filing this brief in support of an appeal as set forth in 37 C.F.R. §1.17(c). If necessary, authority is given to charge/credit Deposit Account 50-0996 additional fees/overages in support of this filing.

**I. Real Party In Interest**

The real party in interest is NXP Semiconductors. The application is presently assigned of record, at reel/frame nos. 019719/0843 to NXP, B.V., headquartered in Eindhoven, the Netherlands.

**II. Related Appeals and Interferences**

While Appellant is aware of other pending applications owned by the above-identified Assignee, Appellant is unaware of any related appeals, interferences or judicial proceedings that would have a bearing on the Board's decision in the instant appeal.

**III. Status of Claims**

Claims 1-18 stand rejected and are presented for appeal. A complete listing of the claims under appeal is provided in an Appendix to this Brief.

**IV. Status of Amendments**

No amendments have been filed subsequent to the Final Office Action dated July 6, 2009.

**V. Summary of Claimed Subject Matter**

As required by 37 C.F.R. § 41.37(c)(1)(v), a concise explanation of the subject matter defined in the independent claims involved in the appeal is provided herein. Appellant notes that representative subject matter is identified for these claims; however, the abundance of supporting subject matter in the application prohibits identifying all textual and diagrammatic references to each claimed recitation. Appellant thus submits that other application subject matter, which supports the claims but is not specifically identified above, may be found elsewhere in the application. Appellant further notes that this summary does not provide an exhaustive or exclusive view of the present subject matter, and Appellant refers to the appended claims and their legal equivalents for a complete statement of the invention.

Commensurate with independent claim 1, a power converter comprises: a current path that includes an inductor (*e.g.*, FIGs. 1-4, element 6; pg. 5:8-20) having an input for receiving energy from a power supply (*e.g.*, FIGs. 1-4, element 1; pg. 4:31-5:20) and an output

capacitor (*e.g.*, FIGs. 1-4, element 7; pg. 5:8-20) for providing an output voltage; an additional current path, beginning at an output of the inductor and including a circuit element (*e.g.*, FIG. 2, element 22; pg. 5:21-6:7) configured to open and close the additional current path, said additional current path formed such that a current flowing through said additional current path reaches basically immediately a desired value (*e.g.*, pg. 2:15-3:19), when said additional current path is opened; a first switch (*e.g.*, FIGs. 1-4, element 2; pg. 4:31-5:20) coupled between the power supply and the inductor, the first switch configured to provide the energy from the power supply to the inductor; and a feedback circuit (*e.g.*, pg. 5:21-30) configured to control the circuit element to open said additional current path, when said output voltage across said output capacitor reaches a predetermined maximum value (*e.g.*, pg. 6:5-7), wherein the inductor provides the energy from the power supply to a parallel arrangement of the output capacitor and the additional current path.

Commensurate with independent claim 10, a method is implemented for controlling a power converter, the power converter including a current path having an inductor (*e.g.*, FIGs. 1-2, element 6; pg. 5:8-20) with an input for receiving energy from a power supply (*e.g.*, FIGs. 1-4, element 1; pg. 4:31-5:20) and an output capacitor (*e.g.*, FIGs. 1-4, element 7; pg. 5:8-20) for providing an output voltage, said method comprising: providing the energy from the power supply to the inductor via a switch (*e.g.*, FIGs. 1-4, element 2; pg. 4:31-5:20); and opening a controllable additional current path (*e.g.*, pg. 5:15-20) arranged to begin at an output of the inductor and in parallel to said output capacitor, when said output voltage across said output capacitor reaches a predetermined maximum value (*e.g.*, pg. 6:5-7), such that a respective desired current flows basically immediately through said additional current path (*e.g.*, pg. 2:15-3:19); wherein the inductor provides the energy from the power supply to the parallel arrangement of the output capacitor and the additional current path.

## **VI. Grounds of Rejection to be Reviewed Upon Appeal**

The grounds of rejection to be reviewed on appeal are as follows:

A. Claims 1 and 16 stand rejected under 35 U.S.C. § 112(2).

- B. Claims 1 and 5-18 stand rejected under 35 U.S.C. § 102(b) over Massie (U.S. Patent No. 6,285,175).
- C. Claim 2 stands rejected under 35 U.S.C. § 103(a) over the '175 reference in view of Irvine (U.S. Patent No. 6,225,859).
- D. Claims 3-4 stand rejected under 35 U.S.C. § 103(a) over the '175 reference in view of Schneiderman (U.S. Patent No. 4,301,801).

## **VII. Argument**

The Examiner's position for each of the rejections is misplaced and relies upon improper interpretations and mistaken assumptions. For instance, the rejections under § 112(2) are based upon claim limitations that are no longer present. Thus, despite amendments to the claims that facilitated prosecution by removing/amending the claim language in question, the Examiner has maintained the rejections without acknowledging the amendments and improperly bases the rejection upon claim language that is no longer present.

In another instance, the Examiner attempts to address claim language that appeared to have been overlooked in the underlying rejection by asserting an interpretation that goes against common sense, contradicts the fundamental purpose of circuit elements and Appellant's specification and thereby contradicts any reasonable interpretation. As this untenable interpretation was presented for the first time in the Advisory Action, Appellant rebuts this newly presented argument with an extrinsic evidentiary definition that aligns with the common sense/plain meaning interpretations that should have been applied as it merely supports the plain meaning for a well understood term. Thus, the inclusion of extrinsic evidence is not deemed to be necessary to overcome the instant rejections.

### **A. The Rejection Of Claims 1 And 16 Under 35 U.S.C. § 112(2) Is Improperly Based Upon Non-Existent Claim Limitations.**

The Examiner's basis for the rejection relies upon a version of the claims that is no longer present due to facilitating amendments. This fact was brought to the Examiner's

attention in Appellant's response of August 27, 2009 and never addressed. Accordingly, there is not a *prima facie* case for the rejection.

Moreover, the underlying basis for the rejection (despite not being shown as pertinent to the current claim limitations) is an impermissible attempt to limit the breadth of the claims. In pertinent part, the Examiner's alleged reasons for indefiniteness is simply whether or not there could be more than one element that opens the circuit path. This is simply an acknowledgement that the claim limitations are not limited to a single element and might encompass embodiments with multiple elements. As no reason is presented for why the inclusion of multiple elements renders the claims indefinite, the Examiner has done no more than comment on the breadth of the claims. "Breadth of a claim is not to be equated with indefiniteness." M.P.E.P. § 2713.04 citing to *In re Miller*, 441 F.2d 689 (CCPA 1971). Accordingly, there is no basis for the rejection due to the current state of the claims, nor was there a basis for the rejections under the previous state of the claims. For at least these reasons the rejections are improper and should be reversed.

**B. The Rejection Of Claims 1 And 5-18 Under 35 U.S.C. § 102(B) Is Improper For Lack Of Correspondence Due To An Improper Interpretation And Because Correspondence Is Not Present For Various Claim Limitations.**

The Examiner presented the rejection in view of the '175 reference for the first time in the Final Office Action of July 6, 2009. The rejection cites to a path between an output of the circuit and ground of the circuit. The path includes a series combination of an inductor 280 and a transistor 310. Appellant's response of August 27, 2009 notified the Examiner that limitations directed toward "basically immediately" reaching the desired current were not addressed. In pertinent part, the teachings expressly teach the inclusion of an inductor in the current path, which necessarily prevents immediate current flow in the circuit. This aspect is expressly taught to be a key component to achieving the stated function of this circuit portion of the '175 reference ("The current of inductor 280 inhibits the output voltage signal V5 from dropping further and, in fact, may increase the value of voltage V5 until the voltage at the positive input terminal of the driver 240 exceeds the reference voltage V7.") Col. 4:23-27. The Examiner's first attempt to address these limitations was presented in the Advisory Action of September 15, 2009. Appellant submits that the plain meaning of the term

immediately is “without lapse of time; without delay; instantly; at once.” immediately.

Dictionary.com. *Dictionary.com Unabridged*. Random House, Inc.

<http://dictionary.reference.com/browse/immediately> (accessed: November 01, 2009). The

Examiner presents an interpretation that effectively ignores these limitations by defining immediately to encompass delay times caused by circuit elements expressly designed to delay current flow. Thus, the Examiner would interpret immediately so broadly that it would encompass circuits specifically designed to introduce delay, despite the plain meaning of the limitations being “without delay.” This interpretation has the effect of impermissibly reading the limitations out of the claim, goes against common sense and is inconsistent with Appellant’s specification, as explained in more detail below.

Ohm’s law states that current through an inductor is defined by  $I = L/V$ , where I is current, L is inductance and V is voltage. Consistent with this law an inductor resists changes in current. Thus, an inductor functions as an open circuit in response to an applied voltage and delays current flow in response to an applied voltage. Accordingly, for all practical purposes and consistent with the plain meaning, placing an inductor within a current path introduces a delay in current flow, thereby basically prohibiting current from immediately reaching the desired value for the current path. Thus, the skilled artisan would unquestionably recognize that a direct effect of the inductor in the primary reference would be the delay of current flow. The Examiner’s arguments to the contrary have no basis in the record, are contradicted by the references, Appellant’s specification and by common sense. While an Examiner is afforded some leeway in construing claims according to the broadest reasonable interpretation, the interpretation must, nevertheless, be reasonable. Here, the Examiner proposes an interpretation that expressly contradicts the clear function and intent of the allegedly corresponding circuit/inductor. As such, the skilled artisan would not interpret the claim limitations as encompassing a current path that is explicitly designed so as to delay current from flowing.

Moreover, Appellant’s specification expressly distinguishes from a current path with an inductor. As such, the Examiner’s proposed definition is precluded. “The broadest reasonable interpretation of the claims must also be consistent with the interpretation that those skilled in the art would reach.” M.P.E.P. § 2111 citing to *In re Cortright*, 165 F.3d

1353, 1359 (Fed. Cir. 1999). In pertinent part, Appellant's specification explains that the use of an inductor prohibits immediate current flow because it introduces a current delay. "In patent application WO 01/59917, it has been proposed to use an inductance, which is composed of a first inductor and a second inductor connected in parallel to each other. The branch comprising the second inductor comprises in addition a switch, which is only closed during load transients. This solution enables a reduction of voltage ripples, but due to the characteristics of an inductor, the reaction time is rather slow, since the current through the branch is only build up slowly....In contrast to the solution according to document WO 01/59917, the proposed power converter is moreover able to react immediately to a detected reduction of the connected load. Since a defined additional current path is provided, instead of an additional inductor, the compensation is not subject to a delay due to the gradual increase of the current through the additional inductor, as in document WO 01/59917." Appellant's specification, pp. 2-3.

Accordingly, the Examiner's proposed interpretation is inconsistent with the plain meaning, would not be reasonably interpreted as such by the skilled artisan and is inconsistent with Appellant's specification. As such, the evidence of record indicates that the Examiner's proposed interpretation is erroneous, contradicted by evidence of record and conclusory with a lack of evidentiary support. The rejection should therefore be reversed because the Examiner has not presented a *prima facie* case and the record contains ample evidence to render the Examiner's conclusory interpretation unreasonable.

Moreover, Appellant submits that the rejection is further improper due to a lack of correspondence to other claim limitations. For instance, the '175 reference does not enable the additional current path in response to a predetermined maximum value of the output. The '175 reference is specifically designed to detect transient voltages relative to changes from a current average voltage (seen on C320). Thus, the circuit functions upon a relative voltage that fluctuates over time. Thus, the circuit does not react to a predetermined maximum value and instead reacts to a relative/dynamic voltage. In pertinent part, the '175 reference explains that the "voltage on capacitor 320 is equal to the average voltage value of the output or load voltage". Col. 4:7-9. It is this capacitor value that is used as the reference point for enabling/disabling the identified additional current path. As this value on capacitor 320 is a

variable value equal to the average voltage of the output over time, the circuit does not function in the manner asserted by the Examiner (*i.e.*, the circuit does not enable/disable in response to a predetermined voltage maximum of the output). Instead, the circuit is designed to function by responding to transient voltages. This necessarily means that the circuit is not designed to respond to a predetermined value of the output voltage as the trip point of the circuit fluctuates pursuant to the voltage seen on capacitor 320. Accordingly, the rejection is based upon a conclusion of correspondence that has no support in the record. Accordingly, the Examiner has failed to present a *prima facie* case and the rejection should be reversed for lack of correspondence.

**1. The Rejection Of Claims 5-6 And 13-14 Under 35 U.S.C. § 102(B) Is Improper For Lack Of Correspondence.**

The Examiner has failed to show that the circuit of the '175 reference operates according to a predetermined time. Instead, the time is highly-variable and depends upon unknown circuit conditions. Thus, there is no correspondence as the aspects identified by the Examiner do not provide a predetermined (*i.e.*, known in advance) time for control of the identified circuit elements. In pertinent part the '175 reference teaches that the identified circuit element 310 is controlled based upon the transient voltages seen on the output. Thus, the enable/disable timing of this circuit element varies according to circuit conditions and is therefore not a predetermined time. Instead, it is a dynamically determined time. Accordingly, the record does not support the Examiner's conclusion of correspondence and the rejection should be reversed for these claims.

**C. The Rejection Under 35 U.S.C. § 103(A) Of Claim 2 Is Improper For Lack Of Correspondence, Being Based Upon An Illogical Combination, Lack Of A Clearly Articulated Explanation For The Rejection And Because The Primary Reference Teaches Away From The Asserted Combination.**

The rejection of claim 2 is improper for the reasons presented in connection with the rejection under § 102(b) as explained in the aforementioned Section B. The addition of the '859 reference does not cure these deficiencies.

Moreover, the '859 reference is substantially unrelated in both function and design to that of the primary reference. As such, a *prima facie* case has not been presented because the



Examiner fails to clearly articulate details of the proposed modification and because the Examiner fails to clearly articulate how this modification would function.

For instance, there is no evidence to support the conclusion that additional shunting action is desirable. The Examiner has not linked any beneficial aspects that would be gained from additional shunting. Thus, it appears that the Examiner is merely adding an element, using impermissible hindsight reconstruction, and then claiming an attribute is beneficial without any reasoning to explain why the skilled artisan would agree with the conclusion or see the modification as obvious. Thus even assuming, *arguendo*, that additional shunting would be provided in some (unidentified and hypothetical) combination, there is no evidence that the skilled artisan would seek such shunting. Instead, it would appear that such shunting would change the operation of the primary device and, quite likely, worsen the function of the primary device. As the Examiner has hereto not explained how this combination is to be implemented, it is not possible to fully assess these aspects. This shows that the Examiner's proposed combination is not sufficient to provide a *prima facie* case because the lack of such an explanation shows that no analysis of the desirability of the combination could have been performed.

For instance, it is unclear how the circuit would function if a variable current source were added. The usage of a variable current source taught by the '859 reference does not explain how (or why) to implement such a current source within the primary reference. No teachings explain how control of a variable current source would be implemented or why this aspect would be desirable. At best, the skilled artisan would be left to experiment, design a circuit virtually from scratch and determine what, if any, effect such a variable current source would have. Such open-ended hypothetical allegations are insufficient to establish a *prima facie* case of obviousness. "(I)nventions in most, if not all, instances rely upon building blocks long since uncovered, and claimed discoveries almost of necessity will be combinations of what, in some sense, is already known." *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 419 (U.S. 2007). Here, the Examiner has done little more than allege that an, as yet unidentified, combination may have been obvious to try. The "obvious to try" standard may not be applied where one would have "to vary all parameters or try each of numerous possible choices until one possibly arrived at a successful result, where the prior art gave

either no indication of which parameters were critical or no direction as to which of many possible choices is likely to be successful.” *In re Kubin*, 561 F.3d 1351, 1359 (Fed. Cir. 2009), interpreting *KSR*. See also M.P.E.P. § 2143(E), and *Gillette Co. v. S.C. Johnson & Son, Inc.*, 919 F.2d 720, 725 (Fed. Cir. 1990) (“we have consistently held that ‘obvious to try’ is not to be equated with obviousness.”). As the Examiner has done little more than identify the existence of a claim element and then allege a combination would have been obvious to try, there is not *prima facie* case for the rejection.

Notwithstanding the above deficiencies, the combination is further improper because the ‘175 reference expressly teaches away from a modification that would provide additional shunting. See M.P.E.P. 2141 citing to *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984) “A prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention.” As best as can be understood, additional shunting would result in a corresponding decrease in voltage of the output V5. The ‘175 reference, however, expressly teaches away from reducing the output voltage in this manner: “The current of inductor 280 *inhibits* the output voltage signal V5 from dropping further and, in fact, may *increase* the value of voltage V5 until the voltage at the positive input terminal of the driver 240 exceeds the reference voltage V7.” (*emphasis added*) Col. 4:23-27. Thus, the evidence of record supports that the skilled artisan would be lead away from the proposed modification rendering the modification nonobvious.

For the aforementioned reasons, the rejection should be reversed.

**D. The Rejection Of Claims 3-4 Under 35 U.S.C. § 103(A) Is Improper For Lack Of Correspondence, Due To An Illogical Combination And For Lack Of A Clearly Articulated Explanation For The Rejection.**

The rejection of claims 3-4 is improper for the reasons presented in connection with the rejection under § 102(b) as explained in the aforementioned Section B. The addition of the ‘801 reference does not cure these deficiencies.

Moreover, the ‘801 reference is substantially unrelated in both function and design to that of the primary reference. Appellant submits that a *prima facie* case has not been

presented because the Examiner fails to clearly articulate details of the proposed modification and because the Examiner fails to clearly articulate how this modification would function.

The Examiner does not clearly articulate what the proposed modification is nor does the Examiner clearly articulate how this modification would function. For instance, there is no evidence to support the conclusion that additional current in the direction of ground is desirable. The usage of a resistive path, as taught by the '801 reference, does not explain how (or why) to implement such a resistive path in a manner consistent with, nor desirable to, the purpose of the primary reference. At best, the skilled artisan would be left to experiment, design virtually from scratch and determine what, if any, effect such a resistive path would have. Such open-ended hypothetical allegations are insufficient to establish a *prima facie* case of obviousness (*see, e.g., KSR* at 419; *see also In re Kubin* at 1359).

Notwithstanding the above deficiencies, the combination is further improper because the '175 reference expressly teaches away from a modification that would provide additional current to ground. *See* M.P.E.P. 2141 citing to *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984) "A prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention." As best as can be understood, this additional current would result in a corresponding decrease in voltage of the output V5. The '175 reference, however, expressly teaches away from reducing the output voltage in this manner: "The current of inductor 280 *inhibits* the output voltage signal V5 from dropping further and, in fact, may *increase* the value of voltage V5 until the voltage at the positive input terminal of the driver 240 exceeds the reference voltage V7." (*emphasis added*) Col. 4:23-27. Thus, the evidence of record supports that the skilled artisan would be lead away from the proposed modification rendering the modification nonobvious.

For the aforementioned reasons, the rejection should be reversed.

**VIII. Conclusion**

In view of the above, Appellant submits that the rejections of claims 1-18 are improper and therefore requests reversal of the rejections as applied to the appealed claims and allowance of the entire application.

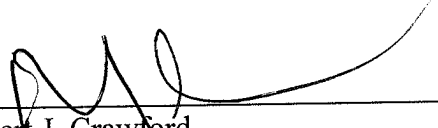
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**APPENDIX OF CLAIMS INVOLVED IN THE APPEAL**  
(S/N 10/534,480)

1. Power converter comprising:

a current path that includes an inductor having an input for receiving energy from a power supply and an output capacitor for providing an output voltage;

an additional current path, beginning at an output of the inductor and including a circuit element configured to open and close the additional current path, said additional current path formed such that a current flowing through said additional current path reaches basically immediately a desired value, when said additional current path is opened;

a first switch coupled between the power supply and the inductor, the first switch configured to provide the energy from the power supply to the inductor; and

a feedback circuit configured to control the circuit element to open said additional current path, when said output voltage across said output capacitor reaches a predetermined maximum value,

wherein the inductor provides the energy from the power supply to a parallel arrangement of the output capacitor and the additional current path.

2. Power converter according to claim 1, wherein said additional current path comprises a controllable current source.

3. Power converter according to claim 1, wherein said additional current path is a low impedance path when open.

4. Power converter according to claim 3, wherein said low impedance path comprises a resistor.

5. Power converter according to claim 1, wherein said feedback circuit is configured to control the circuit element to open said additional current path for a predetermined time.

6. Power converter according to claim 1, wherein said feedback circuit is configured to control the circuit element to close the additional current path when a second predetermined output voltage is reached.
7. Power converter according to claim 1, wherein said feedback circuit is configured to control the circuit element to open and close the additional current path based on said output voltage.
8. Power converter according to claim 1, wherein said feedback circuit is configured to control the circuit element to open and close the additional current path based on a current through said inductor.
9. Power converter according to claim 1, wherein said power converter is one out of a group of a buck converter, a boost converter and a buck/boost converter.
10. Method for controlling a power converter, the power converter including a current path having an inductor with an input for receiving energy from a power supply and an output capacitor for providing an output voltage, said method comprising:
  - providing the energy from the power supply to the inductor via a switch; and
  - opening a controllable additional current path arranged to begin at an output of the inductor and in parallel to said output capacitor, when said output voltage across said output capacitor reaches a predetermined maximum value, such that a respective desired current flows basically immediately through said additional current path;
  - wherein the inductor provides the energy from the power supply to the parallel arrangement of the output capacitor and the additional current path.
11. The method of claim 10, wherein the additional current path includes a controllable element for opening and closing the additional current path.

12. The method of claim 11, further comprising using the controllable element to inhibit the energy provided by the inductor from flowing through the additional current path when the additional current path is closed.
13. The method of claim 10, further comprising opening the additional current path for a predetermined amount of time.
14. The method of claim 10, further comprising closing the additional current path when the output voltage reaches a second predetermined value.
15. The method of claim 10, further comprising controlling opening and closing of the additional current path responsive to a current through the inductor.
16. Power converter according to claim 1, wherein the circuit element is a controllable element for opening and closing the additional current path.
17. Power converter according to claim 16, further comprising a second switch that is coupled between the inductor and ground and that is coupled to the first switch.
18. Power converter according to claim 16, wherein the controllable element inhibits the energy provided by the inductor from flowing through the additional current path when the additional current path is closed.

## **APPENDIX OF EVIDENCE**

Appellant is unaware of any evidence submitted in this application pursuant to 37 C.F.R. §§ 1.130, 1.131, and 1.132.



## **APPENDIX OF RELATED PROCEEDINGS**

As stated in Section II above, Appellant is unaware of any related appeals, interferences or judicial proceedings.